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EXAMINER	
SHERALI, ISHRAT I	
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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/965,922	PRABHAKAR ET AL.	
	Examiner	Art Unit	
	Sherali Ishrat	2621	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-30* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-26,29 and 30* is/are rejected.

7)☐ Claim(s) *27-28* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *28 September 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *9/28/2001*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Double Patenting

1. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970);and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

2. Claim 1 is rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 1 of copending Application 09/965880. Although the conflicting claims are not identical, they are not patentably distinct from each other because they cover the same subject matter, the difference between claim of instant application and claim 1 of copending Application 09/965880 is that claim 1 of instant application is broader than claim 1 of copending Application 09/965880. Claim 1 of instant Application and claim 1 of copending Application 09/965880 both recite "A method of classification of an image, comprising: extracting a plurality of features from an input image; and classifying the input image in picture or graphics.

This is provisional obviousness-type double patenting rejection because the conflicting claims have not been patented the conflicting claim have not been patented.

3. Claims 6-8 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-2 and 6 of copending Application 10/040692. Although the conflicting claims are not identical, they are not patentably distinct from each other because they cover the same subject matter, the difference between claim 6 of instant application and claim 1 of copending Application 10/040692 is that claim 1 of instant application is broader than claim 1 of copending Application 10/040692. Claim 6 of instant Application and claim 1 of copending Application 10/040692 both recite "A method of classification of an input image in picture or graphics comprising: extracting color discreteness features from an input image; processing extracted features using an algorithm associated with the feature; comparing the result of feature algorithm to a threshold; and according to previously determined rules, any comparison is determinative of the input image, classifying the input in either the natural picture or graphics according to previously determined rules, otherwise indicating the result is indeterminate.

This is provisional obviousness-type double patenting rejection because the conflicting claims have not been patented the conflicting claim have not been patented.

4. Claims 9-11 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 7 of copending Application 10/040692 in view of Schettini et al. (Color Image Classification Using Tree Classifier, ITIM, IAMI). Although the conflicting claims are not identical, they are not patentably

distinct from each other because they cover the same subject matter, the difference between claims 9-11 of instant application and claim 7 of copending Application 10/040692 is that claim 7 of copending Application 10/040692 does not require normalizing histograms.

In the same field of endeavor Schettini discloses normalizing the histogram of CIELAB (Schettini, page 270, left-column, lines 47-48, normalizing the histogram).

Therefore it would have been obvious at the time the invention was made to normalize the histogram.

This is provisional obviousness-type double patenting rejection because the conflicting claims have not been patented the conflicting claim have not been patented.

5. Claim 12-13 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-2 of copending Application 10/040693. Although the conflicting claims are not identical, they are not patentably distinct from each other because they cover the same subject matter, the difference between claim 12 of instant application and claim 1 of copending Application 1040693 is that claim 1 of instant application is broader than claim 1 of copending Application 1040693. Claim 12 of instant Application and claim 1 of copending Application both 1040693 recite "A method of classification of an input image picture or graphics comprising: extracting edge features from an input image; processing extracted features using an algorithm associated with the feature; comparing the result of feature algorithm to a thresholds; and according to previously determined rules, any comparison is determinative of the input image, classifying the input in either the

natural picture or graphics according to previously determined rules, otherwise indicating the result is indeterminate.

This is provisional obviousness-type double patenting rejection because the conflicting claims have not been patented the conflicting claim have not been patented.

6. Claims 29-30 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 16 of copending Application 10/040693. Although the conflicting claims are not identical, they are not patentably distinct from each other because they cover the same subject matter, the difference between claim 29-30 of instant application and claim 16 of copending Application 1040693 is that claims 29 of instant application is broader than claim 16 of copending Application 1040693. Claim 29-30 of instant Application and claim 16 of copending Application both 1040693 recite "A binary classifier, a picture processing module, a graphics processing module, a switch for routing the input for image processing and a feature extractor".

This is provisional obviousness-type double patenting rejection because the conflicting claims have not been patented the conflicting claim have not been patented.

7. Claims 3 is rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 2 of copending Application 09/965880 and claim 1 of copending Application 10/040693. Claim 3 of instant application and claim 2 of copending Application 09/965880 both recite extracting gray-level dependence texture features and claim 3 of instant application and claim 1 of copending application 10/040693 both recite processing extracted features using an

algorithm associated with the feature; comparing the result of feature algorithm to a thresholds; and according to previously determined rules, any comparison is determinative of the input image, classifying the input in either the natural picture or graphics according to previously determined rules, otherwise indicating the result is indeterminate.

This is provisional obviousness-type double patenting rejection because the conflicting claims have not been patented the conflicting claim have not been patented.

Claim Rejections - 35 USC § 112

8. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

9. Claim 11 is rejected under 35 USC 112 as being indefinite.

Regarding claim 11, claim in lines 4-5, recites "computing a histogram for the V channel of the transformed image" and in lines 6-7 recites normalizing the histogram for the luminance channel. These limitations are indefinite because histogram is computed for the V channel and the histogram is normalized for the luminance channel. Claim in lines 6-7 should recites normalizing the histogram for the V channel.

Claim Rejections - 35 USC § 102

10. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

11. Claims 1-3, 6-7, 12-14 are rejected under 35 U.S.C. 102(b) as being anticipated by Schettini et al. (Color Image Classification Using Tree Classifier, ITIM, IAMI, The Seventh Imaging Conference, Color Science, System and Application).

Regarding claim 1, Schettini discloses classification of an image (Schettini, in page 269, Paragraph Abstract, left-column, lines 2-5, states "classify color images in predefined classes, classification problem of distinguishing photographs from artworks". This corresponds to classification of an image) comprising;

extracting a plurality of features from an input image (Schettini, page 270, Paragraph Image Description, left-column, lines 4-6, states "extract low-level representation in terms of color, texture and shape features". This corresponds to extracting a plurality of features from an input image); and

classifying the input image in picture or graphics classes using a combination of the extracted features (Schettini, page 270, Paragraph Image Description, left-column, lines 1-6, states "training set and quality of the features used to describe the image content essential for good classification of image", also states "extract low-level representation in terms of color, texture and shape features", and Schettini in page 271, Paragraph Results left-column, lines 2-5, states "we have experimented our approach on high-level classification of classifying of image either as photograph or an art artwork". All this corresponds to classifying the input image in picture or graphics classes using a combination of the extracted features),

the extracted features may be of same or different type (Schettini, page 270, Paragraph Image Description, left-column, lines 4-6, states "extract low-level representation in terms of color, texture and shape features". This corresponds to extracting a plurality of features of different type).

Regarding claim 2, Schettini discloses plurality of types features include texture, color or edge features (Schettini, page 270, Paragraph Image Description, left-column, lines 4-6, states "extract low-level representation in terms of color, texture and shape features". This corresponds to plurality of types features include texture, color or edge features).

Regarding claim 3, Schettini discloses classification of an input image in natural picture or graphics (Schettini, in page 269, Paragraph Abstract, left-column, lines 2-5, states "classify color images in predefined classes, classification problem of distinguishing photographs from artworks". This corresponds to classification of an image in natural picture or graphics), comprising:

extracting one or more spatial gray level texture features from input image (Schettini, page 270, Paragraph Image Description, left-column, lines 4-6, states "extract low-level representation in terms of color, texture and shape features" and Schettini, page 270, Paragraph Image Description, right-column, lines 1-5, states, "the estimation of statistical features based on the neighborhood Gray-tone Difference. This corresponds to extracting spatial gray level texture features from input image);

processing feature using an algorithm associated with feature (Schettini, page 270, Paragraph Image Description, right-column, lines 1-5, states, "the estimation of

statistical features based on the neighborhood Gray-tone Difference i.e coarsness, busyness, contrast are computed. These features are computed as proposed by Amadasum and King. This corresponds to processing feature [neighborhood Gray-tone Difference] using an algorithm associated with feature as proposed by Amadasum and King);

comparing the result of the feature algorithm to one or more threshold (Schettini, page 269, Paragraph Tree Classifier, right-column, lines 12-13, states, "In our problem the **predictors are the features** indexing the images" and Schettini, in page 269, Paragraph Tree Classifier, right-column, lines 25-30, states "The candidate splits are generated by a set of question on values of predictors [features] , which are different depending on the nature of predictor[features]. For a numerical predictor [feature], the admissible question are {is x < c?} where x denotes the value of predictor". This corresponds to comparing the result of the feature algorithm to one or more threshold) and

if according to previously determined rules, any comparison is determinative of the input image, classifying the input in either the natural picture or graphics according to previously determined rules, otherwise indicating the result is indeterminate (Schettini, page 269, Paragraph Tree Classifier, right-column, lines 30-35, states, "At each step of the process all the predictors [features] are searched one by one and for each predictors [features] the best split [classification] is found. Then the best single splits are compared. The process starts at the root and continues on until some rule is satisfied" and in Schettini in page 271, Paragraph Results left-column, lines 2-6, states

"we have experimented our approach on high-level classification of classifying of image either as photograph or an art artwork. Of course both the classes could be further split". This corresponds to if according to previously determined rules, any comparison is determinative of the input image, classifying the input in either the natural picture or graphics according to previously determined rules).

Regarding claim 6, Schettini discloses classification of an input image in natural picture or graphics (Schettini, in page 269, Paragraph Abstract, left-column, lines 2-5, states "classify color images in predefined classes, classification problem of distinguishing photographs from artworks". This corresponds to classification of an image in natural picture or graphics), comprising:

extracting one or more color discreteness features from input image (Schettini, page 270, Paragraph Image Description, left-column, lines 4-6, states "extract low-level representation in terms of color, texture and shape features" and Schettini, page 270, Paragraph Image Description, right-column, lines 6-7, states, "the spatial composition of the color regions is identified" This corresponds to extracting color discreteness features from input image);

processing feature using an algorithm associated with feature (Schettini, page 270, Paragraph Image Description, right-column, lines 6-10, states, "the spatial composition of the color regions is identified by the process of quantization in 11 colors fragmentation of color regions with respect to center of the image". This corresponds to processing feature using an algorithm associated with feature);

comparing the result of the feature algorithm to one or more threshold (Schettini, page 269, Paragraph Tree Classifier, right-column, lines 12-13, states, "In our problem the **predictors are the features** indexing the images" and Schettini, in page 269, Paragraph Tree Classifier, right-column, lines 25-30, states "The candidate splits are generated by a set of question on values of predictors [features] , which are different depending on the nature of predictor[features]. For a numerical predictor [feature], the admissible question are {is x < c?} where x denotes the value of predictor [feature]". This corresponds to comparing the result of the feature algorithm to one or more threshold) and

if according to previously determined rules, any comparison is determinative of the input image, classifying the input in either the natural picture or graphics according to previously determined rules, otherwise indicating the result is indeterminate (Schettini, page 269, Paragraph Tree Classifier, right-column, lines 30-35, states, "At each step of the process all the predictors [features] are searched one by one and for each predictors [features] the best split [classification] is found. Then the best single splits are compared. The process starts at the root and continues on until some rule is satisfied" and in Schettini in page 271, Paragraph Results left-column, lines 2-6, states "we have experimented our approach on high-level classification of classifying of image either as photograph or an art artwork. Of course both the classes could be further split". This corresponds to if according to previously determined rules, any comparison is determinative of the input image, classifying the input in either the natural picture or graphics according to previously determined rules).

Regarding claim 7, Schettini discloses transforming the input image (Schettini, page 270, Paragraph Image Description, left-column, lines 18-20, shows CIELAB color space which is device independent color space and different than color space in which image is obtained/displayed such as RGB);

processing the input image using a low-pass filter (Schettini, page 270, Paragraph Image Description, left-column, lines 22-23, states "the image blurred by averaging in a 3x3 neighborhood". This corresponds to processing the input image using a low-pass filter), and

extracting color discreteness feature from the input image (Schettini, page 270, Paragraph Image Description, left-column, lines 22-25, states "CVV buckets color pixels as coherent or incoherent is determined". This corresponds to extracting color discreteness feature from the input image).

Regarding claim 12, Schettini discloses classification of an input image in natural picture or graphics (Schettini, in page 269, Paragraph Abstract, left-column, lines 2-5, states "classify color images in predefined classes, classification problem of distinguishing photographs from artworks". This corresponds to classification of an image in natural picture or graphics), comprising:

extracting one or more edge features from input image (Schettini, page 270, Paragraph Image Description, left-column, lines 4-6, states "extract low-level representation in terms of color, texture and shape [edge] features" and Schettini, page 270, Paragraph Image Description, left-column, lines 30-35, states, "a histogram of filtered contours directions [edges] is computed". This corresponds to);

processing feature using an algorithm associated with feature (Schettini, page 270, Paragraph Image Description, right-column, lines 30-35 states, "a histogram of filtered contours directions [edges] is computed". This corresponds to processing feature using an algorithm associated with feature);

comparing the result of the feature algorithm to one or more threshold (Schettini, page 269, Paragraph Tree Classifier, right-column, lines 12-13, states, "In our problem the **predictors are the features** indexing the images" and Schettini, in page 269, Paragraph Tree Classifier, right-column, lines 25-30, states "The candidate splits are generated by a set of question on values of predictors [features] , which are different depending on the nature of predictor[features]. For a numerical predictor [feature], the admissible question are {is x < c?} where x denotes the value of predictor". This corresponds to comparing the result of the feature algorithm to one or more threshold) and

if according to previously determined rules, any comparison is determinative of the input image, classifying the input in either the natural picture or graphics according to previously determined rules, otherwise indicating the result is indeterminate (Schettini, page 269, Paragraph Tree Classifier, right-column, lines 30-35, states, "At each step of the process all the predictors [features] are searched one by one and for each predictors [features] the best split [classification] is found. Then the best single splits are compared. The process starts at the root and continues on until some rule is satisfied" and Schettini in page 271, Paragraph Results left-column, lines 2-6, states "we have experimented our approach on high-level classification of classifying of image

either as photograph or an art artwork. Of course both the classes could be further split". This corresponds to if according to previously determined rules, any comparison is determinative of the input image, classifying the input in either the natural picture or graphics according to previously determined rules).

Regarding claim 13, Schettini discloses processing the input image to detect edges (Schettini, page 270, Paragraph Image Description, left-column, lines 30-35 states, "edges are extracted using Canny's edge detector");

creating edge map (Schettini, page 270, Paragraph Image Description, left-column, lines 30-35 states, histogram of contours is computed which corresponds to edge map);

processing the edge map to connect the edges (Schettini, page 270, Paragraph Image Description, left-column, lines 30-35 states, "histogram of filtered contours directions which corresponds to processing the edge map to connect the edges); and

extracting one or more features from edge map (Schettini, page 270, Paragraph Image Description, left-column, lines 30-35 states, "histogram of edges direction is normalized". Histogram of edges direction corresponds to extracting one or more features).

Regarding claim 14, Schettini disclose quantity of vertical or horizontal edges (Schettini, page 270, Paragraph Image Description, left-column, lines 30-35 states, histogram of contours directions is computed therefore Schettini system knows the number vertical or horizontal edges because Schittini is computing histograms of edge directions);

Claim Rejections - 35 USC § 103

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

13. Claims 4-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schettini et al. (Color Image Classification Using Tree Classifier, ITIM, IAMI, The Seventh Imaging Conference, Color Science, System and Application).

Regarding claim 4, Schettini discloses processing the input image using low-pass filter (Schettini, page 270, Paragraph Image Description, left-column, lines 18-23, CIELAB color is quantized in 64 color, image is blurred by local averaging in a 3x3 neighborhood. This corresponds to processing the input image using low-pass filter);

building a spatial gray-level dependence matrix using the processed image (Schettini, page 270, Paragraph Image Description, right-column, lines 1-2, "estimation of statistical features based on Neighborhood Gray-Tone difference Matrix", This corresponds to building a spatial gray-level dependence matrix);

extracting one or more feature from the spatial gray-level matrix (Schettini, page 270, Paragraph Image Description, right-column, lines 1-4, "estimation of statistical features based on Neighborhood Gray-Tone difference Matrix i.e

coarseness, contrast, busyness and complexity are computed". This corresponds to extracting one or more feature from the spatial gray-level matrix).

Schettini has not explicitly disclosed initializing the gray-tone matrix. However Schettini shows page 270, Paragraph Image Description, right-column, lines 1-2, "Neighborhood Gray-Tone difference Matrix. Schettini is esitimating Gray-tone difference matrix for different neighborhood. Therefore it would be necessary to initialize the gray-difference matrix after each or before each neighborhood pixels are processed to estimate the spatial gray-tone matrix for that neighborhood because Gray-Tone difference Matrix is independent for each pixel neighborhood.

Regarding claim 5, extraction of spatial gray level features are performed with at least one of variance feature (Schettini, page 270, Paragraph Image Description, right-column, lines 1-4, "estimation of statistical features based on Neighborhood Gray-Tone difference Matrix i.e coarseness, contrast, busyness and complexity are computed". Statistical feature include variance feature).

14. Claims 8-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schettini et al. (Color Image Classification Using Tree Classifier, ITIM, IAMI, The Seventh Imaging Conference, Color Science, System and Application) in view of Shafarenko et al. (Histogram Based Segmentation in perceptually uniform color space, IEEE 1057-7149/98).

Regarding claim 8, Schettini discloses CIELAB color space (Schettini, page 270, Paragraph Image Description, left-column, lines 18-20, shows CIELAB color space).

Schettini has not explicitly shown CIELUV color space.

In the same field of endeavor Shafarenko shows CIELUV color space (Shafarenko, page 1354, paragraph Introduction, left-column, lines 1-7, LUV color space).

Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to use CIELUV color space as shown by Shafarenko in the system of Schettini by replacing CIELAB color space with CIELUV color space because the spectral classes recognized in an image by a computer vision have to corresponds to chromatic classes perceived as distinct by the human vision system. For this purpose, the CIELUV color space is used in which Euclidean distance between two points is approximately proportional to the perceptual difference between the two colors represented by these points [Shafarenko, as stated in Introduction].

Regarding claims 9-11, Schettini discloses computing the histogram of image in CIELAB color space (Schettini, page 270, Paragraph Image Description, left-column, 24-25, shows histogram of image in CIELAB color space) and

normalizing the histogram based on the number of pixels (Schettini, page 270, Paragraph Image Description, left-column, lines 34-35, shows histogram of image is normalized with respect to total number of pixels).

Schettini however has not disclosed computing independent histograms of L channel, U channel and V channel.

In the same field of endeavor Shafarenko shows computing independent histograms of L channel, U channel and V channel (Shafarenko, page 1354, paragraph

Introduction, right-column, lines 5-7, states "3-D histogram of LUV color space" which corresponds to histograms of L channel, U channel and V channel).

Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to compute histograms of L channel, U channel and V channel and replace in the system of Schettini normalized CIELAB with normalized histograms of L channel, U channel and V channel because the spectral classes recognized in an image by a computer vision have to corresponds to chromatic classes perceived as distinct by the human vision system. For this purpose, the CIELUV color space is used in which Euclidean distance between two points is approximately proportional to the perceptual difference between the two colors represented by these points [Shafarenko, as stated in Introduction].

15. Claims 15-18, 21-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schettini et al. (Color Image Classification Using Tree Classifier, ITIM, IAMI, The Seventh Imaging Conference, Color Science, System and Application) in view of Hartman et al. (US 2002/00678557).

Regarding claim 15, Schettini discloses classification of an image (Schettini, in page 269, Paragraph Abstract, left-column, lines 2-5, states "classify color images in predefined classes, classification problem of distinguishing photographs from artworks". This corresponds to classification of an image

extracting plurality of features from input image (Schettini, page 270, Paragraph Image Description, left-column, lines 4-6, states "extract low-level

representation in terms of color, texture and shape features". This corresponds to extracting a plurality of features from an input image).

scaling two extracted features to binary (Schettini, in page 270, paragraph Image Description left-column, lines 17-22, "the Color Coherence Vectors [color features] in the CIELAB color space quantized in 64 colors. CCV buckets pixels as coherent or incoherent according to whether or not belong to large similarly colored regions". In the system of Schettini bucketing pixels as coherent or incoherent [binarized color feature] corresponds to scaling two extracted features to binary).

processing the scaled features to classify the input image in picture or graphics (Schettini, page 269, Paragraph Tree Classifier, right-column lines 12-13, states, "In our problem the **predictors are the features** indexing the images" and Schettini, in page 269, Paragraph Tree Classifier, right-column, lines 25-30, states "The candidate splits are generated by a set of question on values of predictors [features] , which are different depending on the nature of predictor[features]. For a numerical predictor [feature], the admissible question are {is x < c?} where x denotes the value of predictor and Schettini in page 271, Paragraph Results left-column, lines 2-6, states "we have experimented our approach on high-level classification of classifying of image either as photograph or an art artwork. Of course both the classes could be further split". This corresponds to processing the scaled features to classify the input image in picture or graphics).

Schettini however has not shown neural network. Schettini shows tree classifier (Schettini, page 269, left-column, Paragraph Tree Classifier, lines 1-5).

In the same field of endeavor of classifying image Hartman shows neural network (Hartman in page 2, paragraph, 0027, lines 1-5, "The learning mechanism implements neural network).

Therefore it would have been obvious at the time the invention was made to use neural network as shown by Hartmann in the system of Schettini by replacing learning/training based tree classifier to another learning/training based classifier neural using network because such a system provide classification of images within predetermined accuracy as stated by Hartman in the abstract.

Regarding claim 16-17, Schetinni discloses gray level texture feature (Schetinni, page 270, right-column lines 1-6, neighborhood gray tone difference matrix) and

Gray level dependence matrix, feature include variance feature (Schetinni, page 270, right-column lines 1-6, statistical features based on neighborhood gray tone difference matrix).

Regarding claim 18, Schetinni discloses color discreteness feature (Schettini, page 270, Paragraph Image Description, left-column, lines 4-6, states "extract low-level representation in terms of color, texture and shape features" and Schettini, page 270, Paragraph Image Description, right-column, lines 6-7, states, "the spatial composition of the color regions is identified" This corresponds to extracting color discreteness features from input image)

Regarding claim 21-22, Schettini disclose edge features (Schetinni page 270, Paragraph Image Description, left-column, lines 30-35 states, histogram of contours

directions is computed therefore Schettini system knows the number vertical or horizontal edges because Schittini is computing histograms of edge directions); creating edge map (Schettini, page 270, Paragraph Image Description, left-column, lines 30-35 states, histogram of contours is computed which corresponds to edge map);

extracting edge features from edge map (Schettini, page 270, Paragraph Image Description, left-column, lines 30-35 states, "histogram of filtered contours directions which corresponds to processing the edge map to connect the edges); and

a quantity of horizontal of vertical edges (Schettini, page 270, Paragraph Image Description, left-column, lines 30-35 states, "histogram of edges direction is normalized". Histogram of edges direction corresponds to extracting one or more features and since histogram of edge direction is computer therefore a quantity of horizontal of vertical edges is known in the system of Sschettini).

Regarding claims 23-25, Schettini and Hartman have disclosed classification of images in picture or graphics and Hartman has shown neural network as discussed above. Schettini and Hartman have not disclosed neural network is feed-forward comprising input layer, one hidden layer and output layer and includes back-propagation, source nodes and one neuron. However these components are known in the art of neural network and such limitations are design choice and do not carry patentable weight.

Regarding claim 26, Schettini discloses processing feature using an algorithm associated with feature (Schettini, page 270, Paragraph Image Description, right-column, lines 1-5, states, "the estimation of statistical features based on the

neighborhood Gray-tone Difference i.e coarsness, busyness, contrast are computed. These features are computed as proposed by Amadasum and King. This corresponds to processing feature [neighborhood Gray-tone Difference] using an algorithm associated with feature as proposed by Amadasum and King);

comparing the result of the feature algorithm to one or more threshold (Schettini, page 269, Paragraph Tree Classifier, right-column, lines 12-13, states, "In our problem the **predictors are the features** indexing the images" and Schettini, in page 269, Paragraph Tree Classifier, right-column, lines 25-30, states "The candidate splits are generated by a set of question on values of predictors [features] , which are different depending on the nature of predictor[features]. For a numerical predictor [feature], the admissible question are {is x < c?} where x denotes the value of predictor". This corresponds to comparing the result of the feature algorithm to one or more threshold) and

if according to previously determined rules, any comparison is determinative of the input image, classifying the input in either the natural picture or graphics according to previously determined rules, otherwise indicating the result is indeterminate (Schettini, page 269, Paragraph Tree Classifier, right-column, lines 30-35, states, "At each step of the process all the predictors [features] are searched one by one and for each predictors [features] the best split [classification] is found. Then the best single splits are compared. The process starts at the root and continues on until some rule is satisfied" and in Schettini in page 271, Paragraph Results left-column, lines 2-6, states "we have experimented our approach on high-level classification of classifying of image

either as photograph or an art artwork. Of course both the classes could be further split". This corresponds to if according to previously determined rules, any comparison is determinative of the input image, classifying the input in either the natural picture or graphics according to previously determined rules).

16. Claims 19-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schettini et al. (Color Image Classification Using Tree Classifier, ITIM, IAMI, The Seventh Imaging Conference, Color Science, System and Application) in view of Hartman et al. (US 2002/00678557) as applied to claims 15-17 and further in view of Shafarenko et al. (Histogram Based Segmentation in perceptually uniform color space, IEEE 1057-7149/98).

Regarding claims 19-20, Schettini discloses computing the histogram of image in CIELAB color space (Schettini, page 270, Paragraph Image Description, left-paragraph, lines 24-25, shows histogram of image in CIELAB color space) and

normalizing the histogram based on the number of pixels (Schettini, page 270, Paragraph Image Description, left-paragraph, lines 34-35, shows histogram of image is normalized with respect to total number of pixels).

Schettini and Hartman however has not disclosed computing independent histograms of L channel, U channel and V channel.

In the same field of endeavor Shafarenko shows computing independent histograms of L channel, U channel and V channel (Shafarenko, page 1354, paragraph Introduction, right-column, lines 5-7, states "3-D histogram of LUV color space" which corresponds to histograms of L channel, U channel and V channel).

Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to compute histograms of L channel, U channel and V channel and replace in the system of Schettini normalized CIELAB with normalized histograms of L channel, U channel and V channel because the spectral classes recognized in an image by a computer vision have to corresponds to chromatic classes perceived as distinct by the human vision system. For this purpose, the CIELUV color space can be used in which Euclidean distance between two points is approximately proportional to the perceptual difference between the two colors represented by these points [Shafarenko, as stated in Introduction] thereby providing verifiable results of classification.

17. Claims 29-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schettini et al. (Color Image Classification Using Tree Classifier, ITIM, IAMI, The Seventh Imaging Conference, Color Science, System and Application) in view of Revankar et al. (US 5,767,978).

Regarding claim 29, Schettini discloses producing an output of image associated with an input image based on the classification (Schettini, in page 269, Paragraph Abstract, left-column, lines 2-5, states "classify color images in predefined classes, classification problem of distinguishing photographs from artworks". producing an output of image associated with an input image based on the classification) comprising;

extracting a plurality of features from an input image (Schettini, page 270, Paragraph Image Description, left-paragraph, lines 4-6, states "extract low-level representation in terms of color, texture and shape features". This corresponds to extracting a plurality of features from an input image); and

binary classifier for classifying the input image in picture or graphics classes using a combination of any two extracted features (Schettini, page 270, Paragraph Image Description,left-paragraph, lines 1-6, states "training set and quality of the features used to describe the image content essential for good classification of image", also states "extract low-level representation in terms of color, texture and shape features", and Schettini in page 271, Paragraph Results left-column, lines 2-5, states "we have experimented our approach on high-level classification of classifying of image either as photograph or an art artwork [binary classifier]". All this corresponds to binary classifier for classifying the input image in picture or graphics classes using a combination of two extracted features).

Schettini has not explicitly disclosed a picture and a graphic module for processing the input image using piciture or graphics and a switch for routing the input image based on the classification.

In the same field of endeavor Revankar discloses a picture and a graphic module for processing the input image using picture or graphics image processing function (Revankar, col. 8, lines 54-65, graphics and picture are separated into class, some rendering techniques are suitable for rendering [processing] pictures and some are good for graphics". Furthermore in figure 1 Ravankar shows a picture and a graphic

module for processing classified image and the classified image is routed to these module based on the classification result. This corresponds to a picture and a graphic module for processing the input image using picture or graphics image processing function such as shown in figure 1) and

a switch for routing the input image based on the classification (Revankar in figure 1 shows conditional statement of classification and then the image is routed based on the image classification which is for process region as pictorial image or process region as graphic image which corresponds to a switch for routing the input image based on the classification).

Therefore it would have been obvious at the time the invention was made to use a picture and a graphic module for processing the input image and a switch for routing the input image based on the classification result as shown by Revankar in the system of Schettini because such a system provide optimum image processing techniques for processing the classified graphics or pictorial image.

Regarding claim 30, Schettini discloses extracting plurality of texture, color edge features and binary classifier use combination of features to classify the input image) Schettini, page 270, Paragraph Image Description,left-column, lines 1-6, states "training set and quality of the features used to describe the image content essential for good classification of image", also states "extract low-level representation in terms of color, texture and shape features", and Schettini in page 271, Paragraph Results left-column, lines 2-5, states "we have experimented our approach on high-level

classification of classifying of image either as photograph or an art artwork [binary classifier]". All this corresponds to binary classifier for classifying the input image in picture or graphics classes using a combination of two extracted features)

Allowable Subject Matter

18. Claims 27-28 are objected as being dependent on rejected base claim but would be allowable over prior art of record if rewritten in independent form including limitation of the base claim and any intervening claims.

Contact Information

19. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sherali Ishrat whose telephone number is 703-308-9589. The examiner can normally be reached on 8:00 AM - 4:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Au Amelia can be reached on 703-308-6604. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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